Observations on the Flight Period of Caddis Flies (Trichoptera) at the Lake of Menteith, Perthshire

By Brian Morrison*

While a study of the fish populations of the Lake of Menteith was being undertaken between 1967 and 1971, some observations were made on the many species of caddis occurring there with the primary aim of determining the period of the year during which the adults made their appearance. As the time available for caddis work was limited, the recorded period is almost certainly shorter than the true flight period, but since several species were found outwith the limits noted by Hickin (1967) and Macan (1973), the information collected (Table I) may be of interest to other entomologists. A secondary aim of this study was to try to augment the meagre information available on the diversity of species found in this part of Scotland.

Description of the Lake

The Lake of Menteith (Nat. Grid Ref. NN575005) is situated about 15 miles west of Stirling in an area that is predominantly agricultural. It has a surface area of 650 acres (263 hectares). The southern half of the lake is relatively shallow and the south-west quarter is rarely more than 3 m. deep, but in the northern part there is a narrow trough with a maximum depth of 23 m. The littoral zone is composed mostly of rounded stones 5-20 cm. in diameter, but the south shore consists largely of sand and silt. The reed *Phragmites communis* Trinius is found along most of the shoreline and the other dominant emergent weed, *Polygonum amphibium* L., the amphibious bistort, is widely distributed in water less than 1 m. in depth. *Myriophyllum spicatum* L., the water milfoil, and *Elodea canadensis* Michx., the Canadian pondweed, are among the more common submerged weeds, and quillwort, *Littorella uniflora* Aschers., forms a thick carpet in some areas of the stony littoral.

Chemical analysis of the water indicates that the lake is not very rich, having a pH value of about 7.2 and an alkalinity of about 20 ppm. (expressed as calcium carbonate).

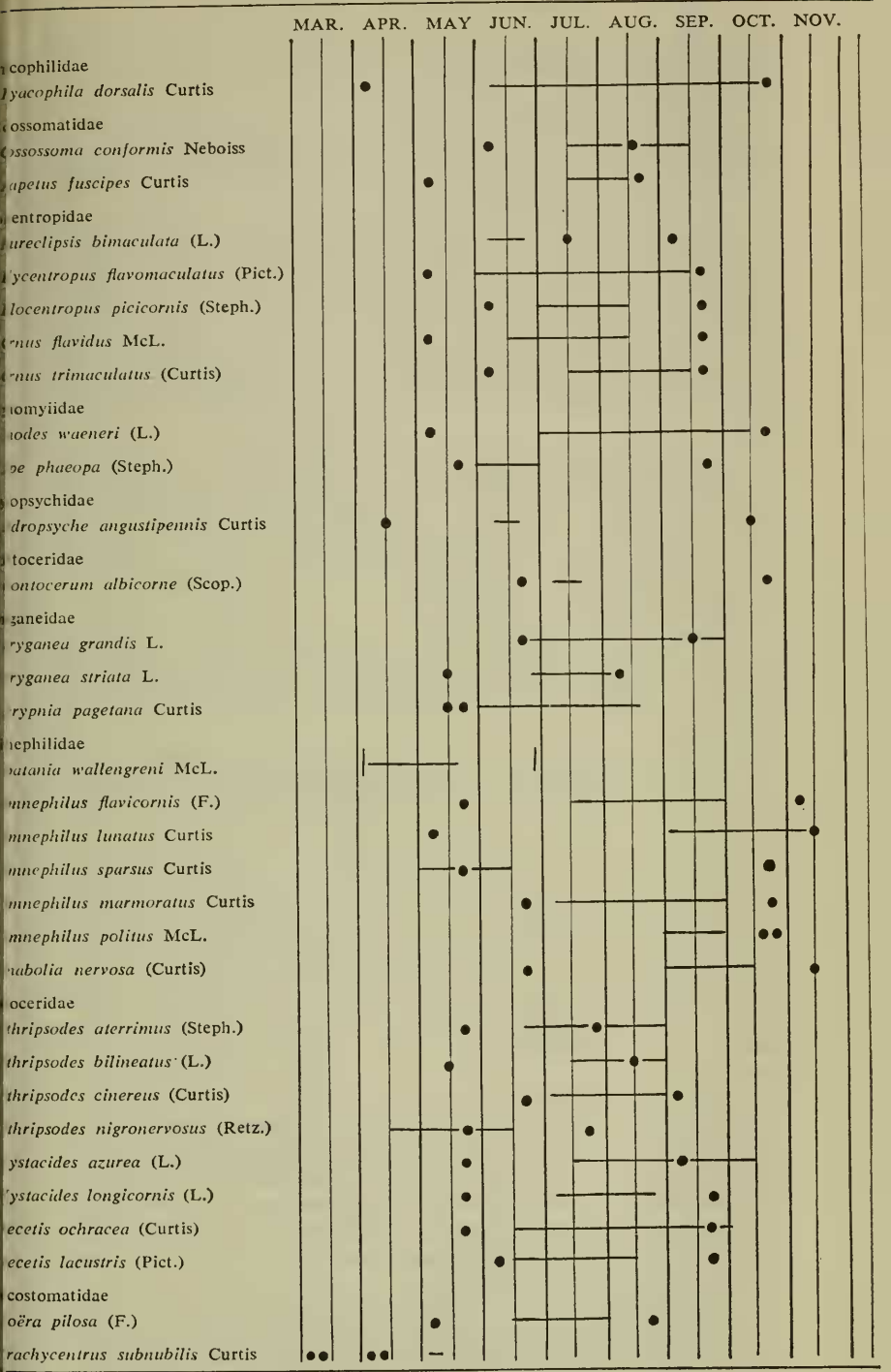
There are two main inflow streams and several smaller ditches and drains. The outlet, the Goudie Burn, carries the water of the lake to the River Forth.

Observations on the Caddis

Family Phryganeidae: Larvae of the genus *Phryganea* were taken in samples of decaying plant material from reed-beds and the lower reaches of the inflow streams. During the daytime the adults were normally found resting in crevices in stonework or the bark of trees, where their predominantly grey-brown colouring provided excellent camouflage. In 1967 and 1968 a few *Agrypnia pagetana* adults were found among the reeds in the south-east corner of the lake, but none were

* Freshwater Fisheries Laboratory, Pitlochry, Perthshire, Scotland.

TABLE I



le 1. Recorded flight period of caddis flies at the Lake of Menteith.

● ● period given by Hickin. ——— period recorded at Menteith.

| | period given by Macan; no data recorded by Hickin.

seen there or elsewhere in subsequent years. The flight period of this species would appear to be longer than indicated by Hickin (1967).

Family Limnephilidae: Only a few species belonging to this large family were recorded, but *Limnephilus lunatus, L. flavicornis* and *Anabolia nervosa* were common every year in late summer and autumn.

Several species of Limnephilidae are known to undergo a period of diapause during the early summer months immediately after emerging from the pupa, and at this time their ovaries are immature (Novak and Sehnal, 1963). They develop fully after diapause, and at Menteith adult *L. lunatus* with mature ovaries were found as late as mid November. The existence of the diapause stage may also explain why these insects are generally more numerous in the latter part of the year.

There is little information in the literature on the most interesting of these insects, *Apatania wallengreni,* but studies on other species wthin the genus have shown that the larvae are inhabitants of cold springs and mountain streams (Nielsen 1943, Elliot 1971). The occurrence of *A. wallengreni* in a low-lying lake such as Menteith (18 m. above sea-level) is therefore of considerable interest.

Family Leptoceridae: Adults of this family were frequently found in large swarms close to the shore. When a sample of insects from one such swarm was examined it was found to contain only one female out of a total of 134 specimens.

On 19th August, 1970, observations were made on two swarms of caddis flying at a distance of 2-3 metres from one another. The species concerned were *Mystacides azurea* and *Athripsodes cinereus,* and the coloration of these insects was sufficiently distinct to indicate that each swarm probably consisted of one species only. Whenever one of the swarms was approached, both moved ahead of the observer, so that the distance between the swarms remained fairly constant. Swarming lasted for only a few minutes at a time, since the insects dspersed whenever a light wind developed. They could then be found among the leaves of the alder trees growing at the water's edge. When the wind dropped, swarming was resumed.

The two forms of *A. aterrimus* (Mosely 1939) were seen at the lake. In one, the forewings were almost black with a pale spot at the arculus (halfway along the hind edge of the wing), and in the other, the forewings were of a uniform reddish-brown colour. In both *M. azurea* and *A. aterrimus* individuals with silvery-white antennae were found with specimens having alternate black and white rings for almost half the length of the antenna.

Mosely described *A. bilineata* as being "very local" and "rarely appearing in large numbers". This species was recorded every year at the lake and was frequently found with *A. cinereus* on trees and grasses by the water's edge.

Family Hydropsychidae: Few adults belonging to this family were observed, which was surprising, since the larvae of at least two species were abundant in the inflow and outflow streams. Although a key to the larvae of all the British species has yet to be published, the information which is available indicates that *Hydropsyche instabilis* Curtis and *H. angustipennis* are both members of the lake fauna.

Family Sericostomatidae: One of the most common caddis flies during the months of June and July was *Göera pilosa* which flew readily in bright sunshine but was most often seen at rest on the underside of alder leaves. The larvae of *Lepidostoma hirtum* and *Notidobia ciliaris* L. were taken regularly in bottom fauna samples from the stony littoral but no adults were collected. Their absence from the Menteith collections is probably a consequence of the limited time available for gathering material.

Of the remaining families, the Polycentropidae were the most widely represented, and both *Polycentropus flavomaculatus* and *Cyrnus trimaculatus* were common as larvae in the stony littoral and as adults. In agreement with Mosely's observation that *Neureclipsis bimaculatus* frequents areas where a river enters or leaves a lake, this species was only recorded from the top 100 metres or so of the Goudie Burn.

As an addendum to these observations, it is worthwhile commenting on the importance of caddis as food for fish. The quantities eaten vary with the seasons (e.g. Morgan 1956), but in May 1972 a trout weighing 1 lb. 10 ozs. caught in Loch Ard, Perthshire, was found to have 851 Limnephilidae pupae in its stomach. The imagines were well-developed within the pupal cases and the insects were presumably captured as they migrated into the shallow water prior to emerging as adults.

References

Elliot, J. M., 1971. The Life-history and biology of *Apatania muliebris* McLachlan (Trichoptera). *Ent. Gaz.*, **22**: 245-251.

Hickin, N. E., 1967. *Caddis Larvae.* Hutchinson, London, pp. xii + 476.

Macan, T. T., 1973. *A key to the adults of the British Trichoptera.* F.B.A. Scientific Publication No. 28: 151 pp.

Morgan, N. C., 1956. The biology of *Leptocerus aterrimus* Steph. with reference to its availability as a food for trout. *J. Anim. Ecol.*, **25**: 349-365.

Mosley, M. E., 1939. *The British Caddis Flies, Trichoptera.* Routledge, London, pp. xiv + 320.

Nielsen, A., 1948. Trichoptera, Caddis Flies; in Berg. K., Biological studies on the River Susaa. *Folia Limnologica Scandinavica,* No. 4: 123-144.

Novak, K. and Sehnal, F., 1963. The development cycle of some species of the genus *Limnephilus* (Trichoptera). *Acta Societatis entomological Czechoslovenicae,* **60**: (1-2): 68-80.

Blair's Mocha in Dorset. — A specimen of *Cyclophora puppillaria* Hb. (Blair's Mocha) occurred here at light on 18th October, 1977. This autumn, several specimens of *Lithophane leautieri* (Blair's Pinion) were recorded at the m.v. trap in my garden as follows: October 6th (2), 17th (1), 21st (1) and November 6th (1). — C. Cattell, 9 Folly Lane, Wareham, Dorset.